PANEL

Heritage 3.0: Virtual Communities and 3D Worlds

Organized by Maurizio Forte (School of Social Sciences, Humanities and Arts, University of California, Merced) and Lily Diaz (Media Lab, University of Helsinki)

Keywords and topics: virtual communities, virtual reality, multiuser domain, embodiment, virtual museums, learning, cyber space.

The immense and incessant growth of the digital information metabolism of Internet has created unpredictable results in a very short time: millions of people are inter-connected and able to share and construct cybernetic contents, but what type of contents? Is this overload of information really able to create new forms of learning and cultural transmission? What kind of information is transmitted to the future? What expectations can we have from the new virtual ecosystems? What we know is that this digital eco-culture creates different relations and feedback; we are moving in the era of the 3D cyberspace where we assist to the embodiment of cross cultural and multidisciplinary communities. If in the past decade, the Internet was principally based on multimedia browsing and structured contents, the new generation of Web is self-organized and reticular, made by de-structured contents and by 3D self-made cyber-spaces. Can this continuously evolving universe of information really construct communication, knowledge and culture? Every complex phenomenon needs time to be monitored and studies, so it is difficult to have an answer today.

We could define the multiuser environments of cyberspace as "mirror communities", because every user/avatar/models-maker makes his/her knowledge throughout the feedback of other users/avatars, so in some way his/her activity is reflected in/from other activities. Moreover the user can see him/herself from any spatial perspective, so he/she is embodied in the system; this embodiment constitutes the new frontier of the informational and communicational process. Every information is surrounded from reticules of additional information, like a universe able to contain infinite sequences of other worlds. How can we define this embodiment? In the ecological thinking the learning process depends on the capacity to produce difference between organisms and ecosystems (Bateson, 1979). Therefore, is the embodiment able to produce difference?

There is a fundamental difference between traditional virtual communities and embodied communities: the first ones use mainly 2D interfaces and chatting, the second ones use 3D dynamic behaviours and interactions. Additionally, embodied communities use a principle of enaction for perceiving and constructing the information. It seems evident that embodiment depends on the level of the engagement inside the cyberspace: so, in theory, the embodied communities should learn and transmit more knowledge and in a shorter time than the traditional "chatting" communities. Unfortunately to transmit knowledge does not mean to transmit cultural information; we have a very limited understanding of how the virtual spaces created by different software and environments differ in the impact on user interactions and cultural learning. This phenomenon has developed a specific terminology: cyberspace, cyber communities, cyber culture, cyber universe, metaverse, cyber anthropology, cyber sociology, usability, user experience, and lastly, cyber archaeology. The need to create new ontologies to reflect the new state of existence can be explained from the growth of the embodied communities and from the birth of distributed forms of digital and social popularization such as the cyber games.The embodied information and the creation of cyber spaces for the archaeological and cultural consumption and communication can represent a totally innovative gateway to the simulation and reconstruction of the past.

Program

Alonzo C.Addison, UNESCO, WHC, VH Network, US

Heritage 2.0: Strategies for Safeguarding a Disappearing World in the Network Age

Just a few decades ago, computer graphic reconstructions of ancient monuments, laser scanning, and real-time GPS mapping of archaeological sites were unheard of, let alone immersive game engines and augmented reality. Now almost two decades old, the use of digital tools in cultural heritage, or 'Virtual Heritage' has matured to the point where photorealistic reconstructions of past worlds are regularly on television, museums tout interactive immersive games, and anyone can construct 3D models of ancient structures with simple tourist photos via 3D webservices. Yet while digital recording, modeling, and dissemination of the past are now commonplace, new challenges have arisen. With more and more of the World's Heritage at risk from development to decay, and massive growth in the digital study of it, the need for a shared, coordinated, global effort to preserve and protect both the monuments and our records of them is growing. Starting with the history of UNESCO and the World Heritage Convention, and moving to the threats facing World Heritage today, we will explore the evolution of the digital heritage domain. Taking lessons from the second-generation internet -- the community web or "Web 2.0"-- strategies for protecting the growing digital records of our heritage will be discussed.

Carlos Aiken, Mohamed Alfarhan, Lionel White, The University of Texas at Dallas; Mohamed Abdelsalam, Missouri University of Science and Technology

Three Dimensional Globally Accessed Monuments Experiment (3D-GAME): The UT Dallas – Missouri S&T Effort

We aim to establish a virtual museum where three-dimensional (3D) photo-realistic virtual replica (3DR) of archeological monuments worldwide can be accessed, visualized and analyzed by individuals in any corner of the globe. We are building on our successful effort in developing 3DR models of archeological sites in the United States including Mount Rushmore carvings in South Dakota and of the Alamo's18th century Spanish Mission in San Antonio, Texas. Additionally, we have an underway effort to create 3DR model for Ramses II Temple in Abu Simbel, Egypt. Besides, we have created a number of 3DR models of geological outcrops that have been used for teaching 3D geological concepts and now we are in the process of developing user-friendly protocol to share these models with the scientific community. The accuracy of these 3DR models is in the range of few mms and they provide an immense virtual reality experience for the viewers when they are displayed in 3D visualization systems. Our effort started by creating 3DR models using cyber-mapping system which allows draping precise photography onto accurately georeferenced feature topology captured by terrestrial Light Detection and Ranging (LIDAR) units. Now we are routinely use the more affordable and easier-to-use SeroVision system which implements oblique photogrammetry concepts. Our 3DR models can also be used to extract precise geometrical information.

Elena Bonini, IMT, Lucca, Italy

Towards An Eco-systemic and Interaction-Centered Approach in the Development of Virtual Environments for Cultural Heritage

Developing effective interactive online exhibitions, virtual museums or more in general multi-user virtual environment (VE) systems for cultural heritage is a new challenge for system developers and human factors specialists. A virtual environment for cultural heritage is feasible and sustainable not only if it respects the interpretative processes of the cultural heritage in itself, but also if it enhances learning and this cooperative interpretation through a suitable system design. Therefore, it is necessary to develop an epistemological approach to virtual "musealization" [8], taking into account the learning processes of human mind and the transmission of culture. In particular, we present some theoretical hypothesis for the development of VE systems, basing on more recent studies on situated cognition, sense of presence, interaction and embodiment. We claim that a virtual application for the enhancement of cultural heritage should be seen as a relational system of symbolic and communicative contextualizations, and we suggest to adopt a relation-centered approach when conceiving VE systems. We will use our theoretical framework for the development of an online VE system, featuring a storytelling and edutainment approach.

Lily Diaz, Media Lab, University of Helsinki, Finland

Virtual reconstruction of the Finnish Pavilion at the World Fair in Paris, 1900

We will present the work that has been done to produce a virtual reconstruction of the Finnish Pavilion at the 1900 Paris World Fair. The reconstruction is a three-dimensional, digital installation that is presented in a virtual reality environment. Wearing circular polarization glasses and using a mouse for interaction, the visitor is able to access a space created using stereoscopic display. The virtual model of the pavilion can be examined both inside and outside. Inside the pavilion model there are digital three-dimensional replicas of some artifacts that were exhibited in Paris. Spatial sounds make the experience feel real, as if one would be moving inside a historical building. In the reconstruction project new possibilities to present content in three-dimensional virtual reality environment in a museum space were examined. We aimed at creating an understanding of how an installation like this fits in a space with a large amount of various kinds of visitors. Furthermore it was cultural-historically important to create a model of a building that does not exist anymore and that is significant from the point of view of Finnish national identity. The work was produced by the Systems of Representation research group of the University of Art and Design Helsinki as part of the HandsOn research project financed by TEKES Finnish Funding Agency for Technology and Innovation and in collaboration with Helsinki Metropolia University of Applied Sciences. The main research objectives of the HandsOn project at Media Lab have been development of new concepts and methods and metaphors for interaction in virtual reality environments. The virtual reconstruction has been on display at the Design Museum Fennofolk – New Nordic Oddity exhibition during 11 June – 28 September 2008.

Maurizio Forte, Nicolò Dell'Unto, UC Merced, US

Embodied Communities, Second Life and Cyber Archaeology

Virtual Heritage can define all the digital processes connected with a multidisciplinary approach to the interpretation, knowledge and communication of cultural heritage. The interpretation and communication process is created by spatial-temporal coordinates but it depends on the sense of place transmitted through cross-cultural domains. This gap of distance in time, space and place between present and past can be partially filled by a virtual reality environment, where the simulation is able to reproduce a holistic context of the cybernetic information. This simulation represents a possible past and the interaction determines the level of communication and exchange with the space (uncoded), first, and the place (coded), then. The result of the mutual eco-interaction and feedback between users and environment constitutes the virtual heritage process. VR, for now mainly offline, but destined to migrate and settle permanent on the web, constitutes the concluding segment of a process of knowledge-communication, precisely because it is able to produce first difference, then knowledge and communication. Most part of the world seems to be interested mainly towards technological and digital aspects of the Virtual, but this direction is over-technological without a correct evaluation of the relations between mind and

environment. We'd like imagine the Virtual like a 3D cyberspace in which artificial organisms and humans interact, move, grow on the basis of rules of the artificial societies and of the relations of the ecosystems; the realm of the Virtual, in technical sense, includes all the 3D worlds where the action/reaction/retroaction is free and in real time. In network and collaborative environments cyberspaces and information are shared and the experience, subjective and objective, is embodied by avatars, actions, interactions, behaviors, navigations, dialogues, feelings, storytelling....This embodiment constitute a new way of learning, communication and cultural transmission; in cybernetic terms it is a "mirror effect", we can display our action and mind in someone's embodiment. At UC Merced we are experimenting digital media learning in Second Life within the UCM Virtual Heritage Island where the students can understand the reconstruction process of the ancient Roman villa of Livia (Augustus' spouse, I cent. A.D.).

Susan Hazan, Museum of Jerusalem, Israel

Musing the Metaverse

This paper will look at the ways in which museums and cultural institutions are moving into Second Life. It will explore how the new, and surprisingly not so new social and cultural experiences are evolving in the immersive, 3D world, and describe the implications of walking or flying around the impressively modelled buildings and environments located in the Linden Lab's grid of thousands of islands. Through a series of case studies of museum builds and islands of cultural interest, we will explore such issues as; community building, immersive experience, copyright protection and social interaction in a world that simply doesn't go away when you log out. This paper considers what it means for a cultural institution to realise their activities, services, exhibitions and institutional vision as they take on a [second] life of their own.

W. Edward Johansen, CENIC, US

Archaeology Research and Education Network of the Mediterranean Region

CENIC (see www.CENIC.org) launched the California Archaeology Research and Education Network on August 12, 2003 with archaeologists participating from Alexandria, Egypt and Paris, France in order to meet with their colleagues in Washington, DC, Los Angeles, Philadelphia and Boston through a videoconference. CENIC convened the International Forum on Digital Humanities, Digital Libraries and Virtual Museum on March 2, 2007 with participants in Cairo, Alexandria, Bologna, Paris, Amsterdam, Cambridge, Washington, DC, Los Angeles, Stanford, Berkeley, Ann Arbor and Fargo again participating through a videoconference. CENIC is convening the Second International Forum on Digital Humanities, Digital Libraries and Virtual Museums: Focusing on the Mediterranean Region on November 10, 2008. During this forum CENIC will launch the Archaeology Research and Education Network of the Mediterranean Region. The coordinators of this network will invite venues in the countries of Egypt, Jordan, Tunisia, Morocco, Algeria, Libya, Germany, Syria, Cyprus, Saudi Arabia, Greece, Turkey, Spain, France, Italy and the United Kingdom to participate. There has already been programming between the United States and the countries of Egypt, Jordan, France, Italy, Tunisia and Saudi Arabia. There are plans to include Spain, Germany, Libya, Morocco and Algeria. In each of the above-mentioned countries at least one Archaeology Research and Education Center either has been or will be set up. The Archaeology Research and Education Network of the Mediterranean Region has been made possible because of the combined efforts of individuals from CENIC, Internet2, GEANT, EUMEDConnect, NEH, NSF and the Egyptian Embassy. The network is based on the concept of sharing. CENIC launched the California Orthopedic Research and Education Network (CORN) on October 29, 2002 at the Internet2 Fall Member Meeting held in Los Angeles. CORN serves as the template for both the California Archaeology Research and Education Network and the Archaeology Research and Education Network of the Mediterranean Region.

Sofia Pescarin, CNR-ITABC, Italy

Building archaeological landscape on line: Virtual Rome web-lab

Virtual Rome web-lab, coordinated and directed by Italian National Council of Researches (CNR ITABC) with the cooperation of CINECA and University of California, regards the development of VR webGIS applications, both front-end and back-end on line solutions, for the interpretation, reconstruction and 3d exploration of archaeological and potential past landscapes of Rome. It is an open laboratory that regards either 3d web technologies development and ancient territory reconstruction methodology testing. We believe in fact that ancient landscape is a perfect case study, because it needs a complete multidisciplinary and interdisciplinary approach, in order to achieve reliable virtual reconstructions. Moreover we tested an open approach, not only in the development of Open Source solutions, but also in the landscape interpretation and 3d reconstruction process. Thanks to a first sponsorship obtained by Seat Yellow Pages and the Roman Chamber of Commerce (Promoroma), we have developed the first VR on line application: Virtual Rome. Thanks to a crossplatform and cross-browser plug-in, OSG4WEB, based on OpenSceneGraph library, it is possible to explore interactively the entire archaeological territory of Rome, as it appears today, and to switch to the 2nd century AD potential landscape. The 3d navigation allows a continuous exploration: from an holistic view of the territory (fly) to a detailed investigation of the archaeological sites (walk). The paper will discuss some relevant issues that "Virtual Rome" on line application had to face, both from archaeological and ICT points of view: reliability of reconstructed past landscape (fig.1); reconstruction as open and scientific process; large territory dataset on line management (32 Gb of high resolution aerial images); different coordinate systems and data resolutions integration; 3d models complexity and dimension (texture and geometry) integration and efficient exploration; vegetation integration; continuous interaction for inter and intra-site browsing (fig.2); plug-in integration in most diffused browser. Proposed solutions and final results will be analyzed and presented. Virtual Rome web-lab, in the next future, is planning to further develop the back-end VR webGIS builder, in order to allow a continuous modification of the landscape and the integration of different 3d project, as a 3d cooperative environment and a reference point for virtual communities.

Eva Pietroni, CNR-ITABC, Italy

Collaborative Environments in Archaeology

This paper will discuss about virtual reality environments and Multiuser Domain for data sharing and interpretation in the field of virtual heritage. The WEB gives people and communities the possibility to have a global connection and interaction, creating new territories, social behaviors and cyberspaces. Internet 2.0 represents the gateway of the cyber-anthropology, the challenge to make new forms of learning and communication. In this context, it is possible to find virtual communities developed entirely within three-dimensional environments, where the users (represented by avatars) can directly contribute to modify and update the cyberspace. Despite the development and these new metaphors of "virtual aggregation", the state of the art in the field of virtual heritage is still quite pioneering, because there are a few Multi-user domains (MuD) specifically for sharing and exchanging cultural and scientific contents. In this contribution we will specifically discuss the FIRB project *Integrated Technologies of robotics and virtual environment in archaeology* (supported by the Italian Ministry of Research), still in progress, but available on the web by the end of this year.

Fathi Saleh, CULTNAT, Egypt

A Holistic Approach to Cultural Heritage Documentation

Abstract not available

Mario Santana Quintero, VSMM, Belgium

Digital tools for heritage places management and protection

This presentation is aimed at demonstrating the need of adequate understanding of heritage places for the design and deployment of resource information systems in their management and protection.
Heritage information plays an essential role in the adequate preparation, implementation and monitoring of conservation strategies. Good decisions in conservation are based on the information available and, in this sense, the use of information systems are needed for providing timely and relevant collection, storage, management and presentation of cultural heritage.